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FORM PTO-1390
REV. 5-93US DEPARTMENT OF COMMERCE
PATENT AND TRADEMARK OFFICEATTORNEYS DOCKET NUMBER
P00,0703**TRANSMITTAL LETTER TO THE UNITED STATES
DESIGNATED/ELECTED OFFICE (DO/EO/US)
CONCERNING A FILING UNDER 35 U.S.C. 371**

U.S. APPLICATION NO. (if known, see 37 CFR 1.5)

09/647021INTERNATIONAL APPLICATION NO.
PCT/DE99/01318INTERNATIONAL FILING DATE
03 MAY 1999PRIORITY DATE CLAIMED
29 MAY 1998

TITLE OF INVENTION

**METHOD FOR DETERMINING THE POSITION OF DEFECTIVE SHIELDING OF A COAXIAL CABLE
OR CONNECTOR IN A COAXIAL CABLE NETWORK**

APPLICANT(S) FOR DO/EO/US

ROLF BLOCK

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay.
4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of International Application as filed (35 U.S.C. 371(c)(2)) - drawings attached.
 - a. ☒ is transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☐ has been transmitted by the International Bureau.
 - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US)
6. ☒ A translation of the International Application into English (35 U.S.C. 371(c)(2)) - drawings attached.
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
 - a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☐ have been transmitted by the International Bureau.
 - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
 - d. ☒ have not been made and will not be made.
8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. below concern other document(s) or information included:

11. ☒ An Information Disclosure Statement under 37 C.F.R. 1.97 and 1.98; (PTO 1449, References, Search Report).
12. ☒ An assignment document for recording. A separate cover sheet in compliance with 37 C.F.R. 3.28 and 3.31 is included.
(SEE ATTACHED ENVELOPE) - Appointment of Associate Power of Attorney Attached.
13. ☒ Amendment "A" Prior to Action
 - ☐ A SECOND or SUBSEQUENT preliminary amendment.
14. ☐ A substitute specification.
15. ☒ A change of address letter attached to the Declaration.
16. ☒ Other items or information:
 - a. ☒ Request for Approval of Drawing Changes, 1 sheet of drawings, Figures 1, 2A, 2B.
 - b. ☒ Appointment of Associate Power of Attorney
 - c. ☒ EXPRESS MAIL # EJ220499387US dated September 26, 2000.

U.S. APPLICATION NO. (if known, see 37 C.F.R. 1.7)

09/647021

INTERNATIONAL APPLICATION NO
PCT/DE99/01318ATTORNEY'S DOCKET NUMBER
P00,070317. ☒ The following fees are submitted:**BASIC NATIONAL FEE (37 C.F.R. 1.492(a)(1)-(5):**

Search Report has been prepared by the EPO or JPO \$840.00

International preliminary examination fee paid to USPTO (37 C.F.R. 1.482) .. \$670.00

No international preliminary examination fee paid to USPTO (37 C.F.R. 1.482) but
international search fee paid to USPTO (37 C.F.R. 1.445(a)(2)) \$760.00Neither international preliminary examination fee (37 C.F.R. 1.482) nor international
search fee (37 C.F.R. 1.445(a)(2)) paid to USPTO \$970.00International preliminary examination fee paid to USPTO (37 C.F.R. 1.482) and all
claims satisfied provisions of PCT Article 33(2)-(4) \$ 96.00**ENTER APPROPRIATE BASIC FEE AMOUNT =**

CALCULATIONS

PTO USE ONLY

\$ 840.00

Surcharge of \$130.00 for furnishing the oath or declaration later than ☐ 20 ☐ 30 months
from the earliest claimed priority date (37 C.F.R. 1.492(e)).

\$

Claims

Number Filed

Number
Extra

Rate

Total Claims

08 - 20 =

0

X \$ 18.00

\$

Independent Claims

01 - 3 =

0

X \$ 78.00

\$

Multiple Dependent Claims

\$260.00 +

\$

TOTAL OF ABOVE CALCULATIONS =

\$ 840.00

Reduction by 1/2 for filing by small entity, if applicable. Verified Small Entity statement must also
be filed. (Note 37 C.F.R. 1.9, 1.27, 1.28)

\$

SUBTOTAL =

\$ 840.00

Processing fee of \$130.00 for furnishing the English translation later than ☐ 20 ☐ 30 months
from the earliest claimed priority date (37 CFR 1.492(f)).

+

\$

TOTAL NATIONAL FEE =

\$ 840.00

Fee for recording the enclosed assignment (37 C.F.R. 1.21(h). The assignment must be
accompanied by an appropriate cover sheet (37 C.F.R. 3.28, 3.31). \$40.00 per property

+

\$

TOTAL FEES ENCLOSED =

\$ 840.00

Amount to be
refunded

\$

charged

\$

a. ☒ A check in the amount of \$ 840.00 to cover the above fees is enclosed.b. ☐ Please charge my Deposit Account No. _____ in the amount of \$ _____ to cover the above fees.
A duplicate copy of this sheet is enclosed.c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any
overpayment to Deposit Account No. 501519. A duplicate copy of this sheet is enclosed.NOTE: Where an appropriate time limit under 37 C.F.R. 1.494 or 1.495 has not been met, a petition to revive (37 C.F.R. 1.137(a) or (b)) must be
filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

SCHIFF HARDIN & WAITE
PATENT DEPARTMENT
6600 Sears Tower
233 South Wacker Drive
Chicago, Illinois 60606-6473

SIGNATURE

Mark Bergner

NAME

45,877

Registration Number

-1-

BOX PCT

IN THE UNITED STATES DESIGNATED/ELECTED OFFICE
OF THE UNITED STATES PATENT AND TRADEMARK OFFICE
UNDER THE PATENT COOPERATION TREATY-CHAPTER II

5

AMENDMENT "A" PRIOR TO ACTION

APPLICANT(S): Rolf Block
ATTORNEY DOCKET NO.: P00,0703
INTERNATIONAL APPLICATION NO.: PCT/DE99/01318
INTERNATIONAL FILING DATE: 03 May 1999

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INVENTION: "METHOD FOR DETERMINING THE POSITION OF
DEFECTIVE SHIELDING OF A COAXIAL CABLE OR
CONNECTOR IN A COAXIAL CABLE NETWORK"

Assistant Commissioner for Patents

Washington, D.C. 20231

15

Sir:

Applicant herewith amends the above-referenced PCT application, and
requests entry of the Amendment prior to examination in the United States
National Examination Phase.

IN THE SPECIFICATION:

20

On pages 1-11, at the top of the pages, delete "GR 98 P 1822";

On page 1, cancel the title and text above line 7, and insert the following
above line 7:

--TITLE

25

**METHOD FOR DETERMINING THE POSITION OF DEFECTIVE
SHIELDING OF A COAXIAL CABLE OR CONNECTOR IN A COAXIAL
CABLE NETWORK**

BACKGROUND OF THE INVENTION

The present invention relates to a method for determining the position of defective shielding of a coaxial cable or connector in a coaxial cable network.--; in line 28, after "laying" insert --the cables--.

5 On page 2, in line 5, cancel "cable, in" substitute --cable. In-- therefor; cancel lines 30-33, substitute the following at line 30:

--SUMMARY OF THE INVENTION

It is an object of the present invention to determine the position of the defective shielding of a coaxial cable more precisely.

10 This object is achieved in accordance with the present invention in a method for determining a position of defective shielding of a coaxial cable, said method comprising the steps of:

coupling to the coaxial cable a first signal and a second signal, said first
signal having a first frequency and modulated by a first sound
signal having a first sound frequency, said second signal having a
15 second frequency higher than said first frequency and modulated
by a second sound signal having a second sound frequency
different than said first sound frequency;
guiding a receiver designed for receiving said first and second signals
along said coaxial cable;
20 when said first signal is received, acoustically reproducing said first sound
signal for indicating said defective shielding in a region; and
when said second signal is received, acoustically reproducing said second
sound signal for establishing said position of said defective
shielding.--;

25 in line 35, preceding "invention" insert --present--.

On page 3, in line 14, cancel "In an advantageous manner, the first";
below line 14, begin a new paragraph with:

--In an embodiment, the first--;

in line 18, cancel "- claim 2. The" substitute --. In an embodiment, the--

therefor;

in line 22, cancel the hyphen, and after "operated" insert a comma;

in line 23, cancel "claim 3 -".

On page 3a, cancel lines 1-2, substitute the following at line 1:

5 --In an embodiment,--.

On page 4, in line 1, cancel "- claim 5";

in line 11, after "device" insert a comma, and cancel the hyphen;

in line 12, after "telephone" insert a comma, and cancel the hyphen;

cancel lines 14-15, substitute the following at line 14:

10 --In an embodiment, the transmission level of--;

in line 19, cancel "- claim 6";

in line 21, after "plugs" insert a comma, and after "20 dB" insert a comma,
and cancel the first and second hyphens;

cancel lines 23-24, substitute the following at line 23:

15 --In an embodiment, the--;

in line 25, after "integrated" insert a period, and cancel the hyphen;

in line 26, cancel "claim 7.", and cancel "In these methods" substitute --
According to this method" therefor, and after "range" insert a
comma;

20 in line 27, after "Hz" insert a comma, and cancel the first and second
hyphens;

in line 33, after "loudspeaker" insert a comma, and after "enabled" cancel
the comma;

cancel lines 36-38, substitute the following at line 36:

25 -- These and other features of the invention(s) will become clearer with
reference to the following detailed description of the presently preferred
embodiments and accompanied drawings.

DESCRIPTION OF THE DRAWINGS

Figure 1 is a block diagram of an arrangement for carrying out the method

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according to the present invention in a coaxial cable network.

Figure 2A is a block diagram showing the essential elements of a receiver according to the present invention.

Figure 2B is a block diagram showing the operator interface of a receiver
5 according to the present invention.

DETAILED DESCRIPTION OF THE PRESENTLY PREFERRED
EMBODIMENTS--.

Cancel page 4a.

On page 5, cancel lines 1-5;

10 in line 14, cancel "- not" substitute --(not-- therefor;
in line 15, after "illustrated" insert a --), and cancel "S1, S2" substitute --
s1, s2-- therefor;
in line 16, preceding "invention" insert --present--;
in line 18, cancel "S" substitute --T-- therefor;
15 in line 20, cancel "S" substitute --T-- therefor;
in line 22, cancel "S1" substitute --s1-- therefor;
in line 24, cancel "S2" substitute --s2-- therefor;
in line 29, cancel "S2" substitute --s2-- therefor.

On page 6, in line 3, after "cable" insert --K--;

20 in line 9, cancel "- not illustrated -" substitute --(not illustrated)-- therefor,
and cancel "s1" substitute --s2-- therefor;
in line 26, after "AWE" insert --, which is--, and cancel the hyphen;
in line 27, after "speaker" insert a comma, and cancel the hyphen;
in line 37, after "EE" insert --, which is--, and cancel the hyphen;
25 in line 38, after "keypad" insert a comma, and cancel the hyphen.

On page 6a, in line 2, after "AZE" insert --, which is--, and cancel the
hyphen, and after "display" insert a comma;

cancel line 3.

On page 7, in line 20, preceding "invention" insert --present--;

in line 24, cancel "firstly" substitute --first-- therefor;

in line 37, preceding "invention" insert --present--;

5 in line 38, cancel "firstly" substitute --first-- therefor.

On page 8, in line 11, after "range" insert a comma, and cancel the hyphen;

in line 12, after "Hz" insert a comma, and cancel the hyphen;

below line 18, insert the following paragraph:

10 -- Although modifications and changes may be suggested by those of
ordinary skill in the art, it is the intention of the inventors to embody within the
patent warranted hereon all changes and modifications as reasonably and properly
come within the scope of their contribution to the art.--.

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IN THE CLAIMS:

On page 9, in line 2, cancel "Patent claims" substitute --**I CLAIM AS MY INVENTION:**-- therefor.

Please cancel claims 1-7.

5 Please add the following new claims 8-15:

8. A method for determining a position of defective shielding of a coaxial cable, said method comprising the steps of:

10 coupling to the coaxial cable a first signal and a second signal, said first signal having a first frequency and modulated by a first sound signal having a first sound frequency, said second signal having a second frequency higher than said first frequency and modulated by a second sound signal having a second sound frequency different than said first sound frequency;

15 guiding a receiver designed for receiving said first and second signals along said coaxial cable;

when said first signal is received, acoustically reproducing said first sound signal for determining a region of said defective shielding; and

20 when said second signal is received, acoustically reproducing said second sound signal for determining said position of said defective shielding.

9. The method as claimed in claim 8, wherein said first frequency of said first signal is in a range of 100 to 200 MHz; and wherein said second frequency of said second signal is in an upper transmission range of said coaxial cable.

25 10. The method as claimed in claim 8, wherein said second frequency of said second signal has a value such that said position of said defective shielding of said coaxial cable can be determined when said coaxial cable has been installed and operated.

11. The method as claimed in claim 8, wherein said coaxial cable is provided in a television distribution network wherein television signals in a range of from 80 to 862 MHz are transmitted; and wherein said second frequency of said second signal is in a range of from one of 750 to 990 MHz or 400 to 500 MHz.

5 12. The method as claimed in claim 8, wherein said first frequency of said first signal and said second frequency of said second signal have values such that an amateur radio receiver designed for a simultaneous reception of two signals can be used as said receiver for a simultaneous reception of said first signal and said second signal.

10 13. The method as claimed in claim 8, further comprising the step of: matching a transmission level of said first signal and said second signal to reception properties of said receiver.

14. The method as claimed in claim 8, further comprising the step of: optionally integrating the "Sub Audio Squelch" method.

15 15. The method as claimed in claim 8, further comprising the step of: attenuating said first signal and said second signal received in said receiver.

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IN THE ABSTRACT:

On page 11, cancel lines 1-5, insert the following centered heading at line 1:

--ABSTRACT OF THE DISCLOSURE--;

5 cancel lines 6-19, substitute the following Abstract of the Disclosure at line 6:

-- A first signal modulated by a first sound signal and having a first frequency and a second signal modulated by a second sound signal and having a second higher frequency are coupled into a coaxial cable. When the first signal is received in a receiver, defective shielding in a region is indicated by acoustic reproduction of the first sound signal and, when the second signal is received, the position of the defective shielding is indicated by acoustic reproduction of the second sound signal.--.

REMARKS:

15 The present Amendment revises the specification, drawings and claims to conform to United States patent practice, before examination of the present PCT application in the United States National Examination Phase. All of the changes are editorial and no new matter is added thereby. Claims 1-7 have been canceled. New claims 8-15 are patentably distinguishable from the known prior art.

20 Early examination on the merits is respectfully requested.

Respectfully submitted,

 (Reg. No. 45,877)
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Description

Method for determining the position of defective shielding of a coaxial cable or connector in a coaxial
5 cable network.

Television distribution networks, also known to experts as CATV networks are predominantly realized by coaxial cables or coaxial cable networks in which, in
10 order to avoid the radiation of the transmitted television signals, one or two metallic shields - usually aluminum foil, but also copper foil or braiding - surrounds or surround the information conductors - i.e. inner conductors. The shielding is preferably
15 connected to the local ground potential layer.

During the installation of such coaxial cable networks, in particular television distribution networks, technically inappropriate laying and technically inappropriate handling mean that the
20 shielding of the coaxial cables incurs damage or high contact resistances arise due to faulty assembly of the connectors. The damage to the shielding is either a destroyed shielding or is constituted by slits in the shielding which are produced during the laying of the
25 coaxial cables as a result of excessively small bending radii, excessively high mechanical stress or as a result of major movements or deformations caused after installation - in particular in the case of laying in the open.

Prior to use of the coaxial cable networks or in the event of complaints concerning excessively low quality of the communicated television signals or radiation of signals in the return channel frequency range, the coaxial cable networks are checked for
30 defective shielding - also called leakage points by experts - as a result of which the television signals to be transmitted are radiated into the open and external signals penetrate into the coaxial cable and
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interfere with the television signals or return channel signals.

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In order to find such leakage points or the position of defective shielding of a coaxial cable, a signal having a frequency of approximately 130 MHz, modulated with a sound signal, is coupled into the coaxial cable, in this case, the frequency chosen lies in the lower region of the frequency range provided for the television distribution. A receiver tuned to the coupled-in signal is in each case guided along the coaxial cable to be examined and is observed in respect of reception of the coupled-in signal. In this case, in particular the measured field strength of a received, coupled-in signal is used to judge the position of the defective shielding of the respective coaxial cable. In principle, the higher the measured field strength, the closer the position of the defective shielding. A further criterion for determining the position of the defective shielding is the sound signal, which is acoustically reproduced after demodulation of a received signal. With this measurement method, the position of defective shielding can be delimited only to a region of approximately 20 m, since the sheath wave produced by the defective shielding propagates 10 to 20 m on the shielding in both directions - given the use of a coupled-in test signal of approximately 130 MHz - as depends on the surroundings of the coaxial cable, e.g. masonry, concrete or steel support - and said sheath wave is received with a different field strength in this region by the receiver and the sound signal is acoustically reproduced.

30 The object on which the invention is based is to determine the position of the defective shielding of a coaxial cable more precisely. The object is achieved by means of the features of patent claim 1.

35 The essential aspect of the method according to the invention is to be seen in the fact that a first signal modulated by a first sound signal and having a first frequency and a second signal modulated by a second sound signal and having a

second frequency are coupled into the coaxial cable, where the second frequency is higher than the first frequency and the sound signals have a different sound frequency. A receiver designed for the reception of the two signals is guided along the coaxial cable, and when the first signal is received, the first sound signal is acoustically reproduced, thereby indicating defective shielding in a region, and when the second signal is received, the second sound signal is acoustically reproduced, thereby establishing the position of the defective shielding. When both signals are received simultaneously, both sound signals are audible when the position of the defective shielding of the coaxial cable is found. In an advantageous manner, the first frequency of the first signal is chosen to be in the range of 100 to 200 MHz and the second frequency of the second signal is chosen to be in the upper transmission range of the coaxial cable - claim 2. The second frequency of the second signal is advantageously chosen in such a way that the determination of the defective shielding of the coaxial cable can be carried out when the coaxial cable has been installed and operated - claim 3 - e.g. including between sound carrier and upper adjacent vision carrier. By coupling in a second signal which is modulated by a second sound signal and whose frequency lies in the range of the operating frequencies, that is to say in the range of the frequency of the television signals, once the 10 to 20 m region has been found, the position of the defective shielding of the coaxial cable to be checked can be localized significantly more precisely, since, in the event of defective shielding, because of the significantly higher frequency and hence higher sheath wave attenuation, the second signal propagates on the coaxial cable in a very small region, that is to say a region measured in centimeters, and is otherwise radiated into the free space.

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According to a particularly advantageous development of the method according to the invention, the frequencies of the first and second signals are chosen in such a way that an amateur radio receiver 5 designed for the simultaneous reception of two signals can be used as the receiver for the reception

of the two signals - claim 5. This choice of the first and second frequencies means that it is possible to use commercially available receivers which are particularly inexpensive and manipulable. Because of their
5 manipulability, these amateur radio receivers can easily be guided along the coaxial cables to be checked and, at the same time, the field strength can be observed and the acoustically reproduced first and second sound signals can be monitored. Furthermore,
10 this amateur radio receiver can advantageously be used additionally as a local communications device - for example as a construction site telephone - in the cable networks, which are usually spread out geographically.

According to a development of a method
15 according to the invention, the transmission level of the first and second signals is matched to the reception properties of the receiver and/or the received signals (s1, s2) are attenuated in the receiver - claim 6. For attenuating the received
20 signals in the receiver, it is possible to insert attenuation plugs - e.g. 80 ohms, 20 dB - into the antenna.

According to a further advantageous refinement of the method according to the invention, the
25 Sub Audio Squelch method is optionally integrated - claim 7. In these methods, a lower audiofrequency range - e.g. 0-300 Hz - is suppressed and a tone or pilot tone having a frequency of 85.4. Hz provided in the case of amateur radio equipment, for example, is
30 transmitted. If this transmitted tone is received with a sufficient level in the receiver, the acoustic reproduction device, that is to say amplifier and loudspeaker is enabled, or inhibited in the event of an insufficient level - referred to as squelch function by
35 experts.

The method according to the invention is explained in more detail below with reference to two drawings, in which:

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Figure 1 shows an arrangement for carrying out the method according to the invention in a coaxial cable network,

Figure 2A shows, in a block diagram, the essential components of a receiver according to the invention and

Figure 2B shows the operator interface of a receiver according to the invention.

Figure 1 shows part of a coaxial cable network KN, which usually has a tree structure and is represented by a coaxial cable K. The coaxial cable K is represented by two lines drawn parallel and a dashed line indicating the inner conductor. During operation, television signals fs are transmitted via the coaxial cable K or via the coaxial cable network KN to transfer points - television connection boxes (not illustrated) - and from there are forwarded to TV devices - not illustrated. For coupling in the signals S1, S2 according to the invention, a coupler KP or the collector array of a TV head end is inserted into the coaxial cable K. A transmitter S is connected to said coupler KP via a coaxial line KL. Two signal generators G1 and G2 are contained in said transmitter S. For the exemplary embodiment, it shall be assumed that a first signal S1 having a first frequency f1 = 130 MHz is formed in the first signal generator G1. This first signal S1 is frequency-modulated with a first sound signal ts1 and with a first sound frequency tf1 = 400 Hz, with a 2 kHz swing. Analogously to this, a second signal S2 having a second frequency f2 = 750 to 990 MHz or 400 to 500 MHz is formed in the second signal generator G2. The second signal S2 is frequency-modulated with a second sound signal ts2 with a second sound frequency tf2 = 1 kHz, with a 2 kHz swing. Both the first signal s1 and the second signal s2 are coupled into the coaxial line KL via the coupler KP. For the exemplary embodiment, it shall be assumed that the two signals s1, s2 are transmitted into the coaxial cable K in the direction indicated by the dotted line provided with an arrow. For the exemplary embodiment, it shall furthermore be assumed that the

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part of the transmitted energy of the signals s1, s2 escapes from the coaxial cable K and propagates on the outer conductor along the coaxial cable. This propagation is referred to as the sheath wave mw by experts. The sheath wave mw of the first signal s1 having the lower frequency f1 propagates, given a sufficient level, approximately 10 to 20 m in both directions of the defective shielding S(d). The sheath wave - not illustrated - of the second signal s1 propagates only a couple of centimeters on account of the considerably higher frequency f2. This very small region is established as position P, since damage or a defect of the coaxial cable K or of the shielding S can easily be found once the said small region has been determined.

Figure 2A shows the fundamental structure of the receiver E in a block diagram. An antenna A is connected to two reception units EE1, EE2, the first reception unit EE1 being tuned to the reception of the first signal s1 and the second reception unit EE2 being tuned to the reception of the second signal s2. If a first signal s1 with a sufficient level is received in the first reception unit EE1, then, after frequency demodulation and sound demodulation, a first sound signal ts1 is passed to an acoustic reproduction device AWE - formed by an amplifier and a connected loud speaker - where it is reproduced acoustically. Analogously to this, in the second reception unit EE2, when a second signal s2 is received, said signal is subjected to frequency demodulation and sound demodulation and a second sound signal ts2 is likewise passed to the acoustic reproduction device AWE, where it is reproduced. The receiver E furthermore contains a control unit ST, which monitors all the components of the receiver E and with the aid of which the frequency setting of the two reception units EE1, EE2 is performed. An input unit EE - usually realized by a keypad - is provided for the inputting of the

corresponding reception frequencies f_2 , f_2 . A display unit AZE - usually realized by a liquid crystal display

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is arranged for displaying reception-specific values. A power supply SV, which is realized for example by rechargeable accumulators, is integrated for supplying energy to all the components of the receiver E.

5 Figure 2B illustrates the operating interface of the receiver E. This is essentially formed by the display unit AZE, the input unit EE and the acoustic reproduction unit AWE. The reception frequencies f_1 , f_2 of the two reception units EE1, EE2 are displayed in
10 the display unit AZE, the two reception frequencies f_1 , f_2 being set by the input unit EE, i.e. with the aid of a keyboard, in such a way that they correspond to the frequencies f_1 , f_2 of the first and second signals s_1 , s_2 . Furthermore, the reception level EP of
15 the first and second signals s_1 , s_2 is displayed in the display unit AZE. The magnitude of the reception level EP is in this case represented by bars whose length or height vary in accordance with the measured reception level EP.

20 According to the invention the receiver E is guided along the coaxial cable K. If said receiver is brought into the region B, in which the sheath wave mw occurs, then firstly the first signal s_1 is received in the receiver E and, given a sufficient reception level
25 EP the first sound signal ts_1 is acoustically reproduced. If the receiver reaches the position P or the very narrow region of the defective shielding S(d), then the second signal s_2 is additionally received in the receiver E and, given a sufficient reception level
30 EP, the second sound signal ts_2 is passed to the acoustic reproduction device AWE, where it is likewise reproduced acoustically. This means that when the second sound signal ts_2 is reproduced acoustically, the position P of the defective or damaged shielding S(d)
35 is established, the position P lying in the region of a few centimeters of the coaxial cable K. The essential advantage of the method according to the invention can be seen in the fact that firstly the

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region B encompassing a number of meters is determined and then, by the receiver E being guided precisely along the coaxial cable K, the position P of the defective shielding S(d) can be determined precisely.

- 5 In order to avoid the acoustic reproduction of noise given the lack of reception of the two signals s1, s2, the method which is referred to as "Sub Audio Squelch" by experts can be integrated both in the transmitter S and the receiver E. Amateur radio
- 10 receivers E usually have this performance feature. In this case, the lower sound frequency range - for example between zero and 300 Hz - is used in order to transmit a sound signal having a frequency of 85.4Hz. In the receiver, this sound signal is used to activate
- 15 or inactivate the acoustic reproduction device AWE. If this specific sound signal is received with a sufficient level, the acoustic reproduction unit AWE is activated, otherwise it remains deactivated.

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Patent claims

1. A method for determining the position (P) of defective shielding (S(d)) of a coaxial cable (K),
- in which a first signal (s1) modulated by a first sound signal (ts1) and having a first frequency (f1) and
 - a second signal (s2) modulated by a second sound signal (ts2) and having a second frequency (f2) are coupled into the coaxial cable (K),
 - where the second frequency (f2) is higher than the first frequency (f1) and the sound signals (ts1, ts2) have a different sound frequency (tf1, tf2),
 - in which a receiver (E) designed for the reception of the two signals (s1, s2) is guided along the coaxial cable (K), and
 - when the first signal (s1) is received, the first sound signal (ts1) is acoustically reproduced, thereby indicating defective shielding (S(d)) in a region (B), and
 - when the second signal (s2) is received, the second sound signal (ts2) is acoustically reproduced, thereby establishing the position (P) of the defective shielding (S(d)).
2. The method as claimed in claim 1, characterized in that the first frequency (f1) of the first signal (s1) is chosen to be in the range of 100 to 200 MHz and the second frequency (f2) of the second signal (s2) is chosen to be in the upper transmission range of the coaxial cable (K).
3. The method as claimed in either of claims 1 and 2, characterized in that the second frequency (f2) of the second signal (s2) is chosen in such a way that the determination of

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the defective shielding (S(d)) of the coaxial cable (K) can be carried out when the coaxial cable (K) has been installed and operated.

4. The method as claimed in one of the preceding claims, characterized

in that the coaxial cable (K) is provided in a television distribution network and television signals (fs) in the range of from 80 to 862 MHz are transmitted, and in that the second frequency (f2) of the second signal (s2) lies in the range of from 750 to 990 MHz or from 400 to 500 MHz.

5. The method as claimed in one of the preceding claims, characterized

in that the first and second frequencies (f_1, f_2) of the first and second signals (s_1, s_2) are chosen in such a way that an amateur radio receiver designed for the simultaneous reception of two signals (s_1, s_2) can be used as the receiver (E) for the simultaneous reception of the two signals (s_1, s_2).

6. The method as claimed in one of the preceding claims, characterized in that the transmission level of the first and second signals (s1, s2) is matched to the reception properties of the receiver (E) and/or the received signals (s1, s2) are attenuated in the receiver (E).

7. The method as claimed in one of the preceding claims, characterized in that the "Sub Audio Squelch" method is optionally integrated.

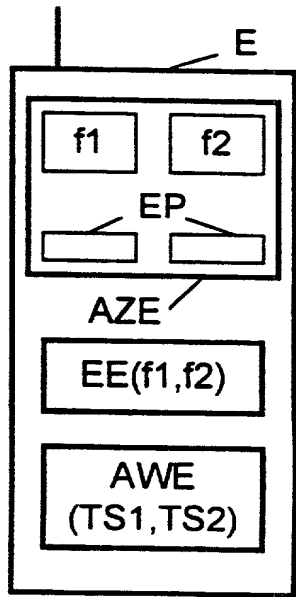
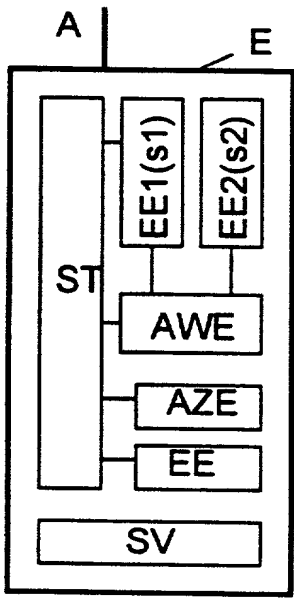
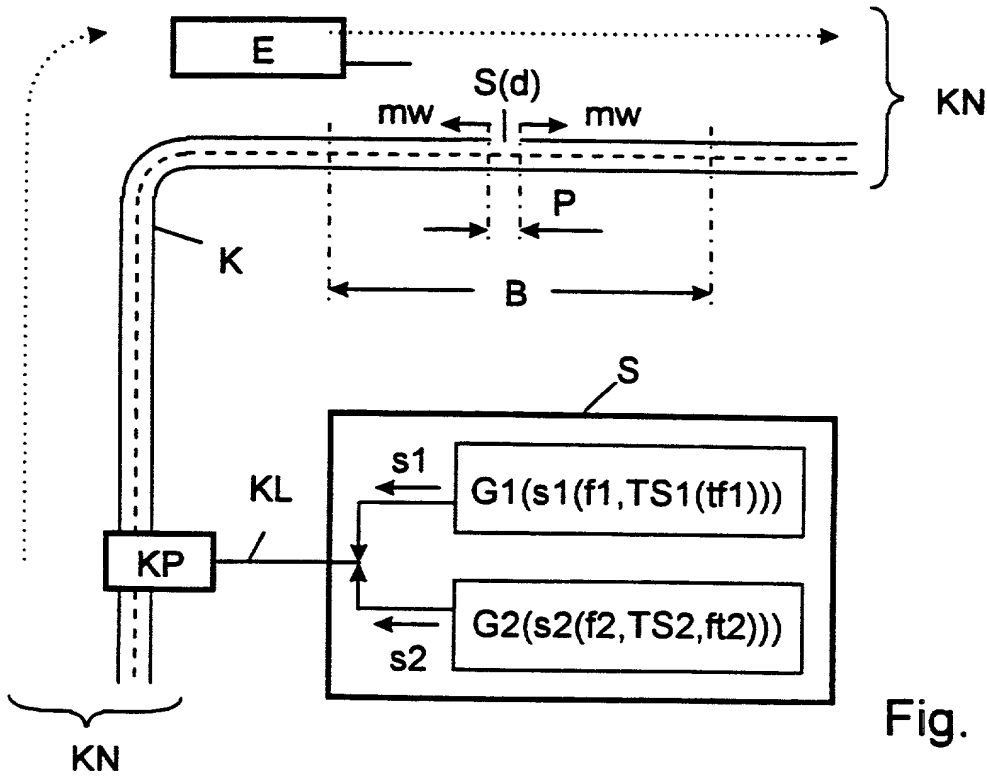
Abstract

Method for determining the position of defective shielding of a coaxial cable or connector in a coaxial cable network

A first signal (s1) modulated by a first sound signal (ts1) and having a first frequency (f1) and a second signal (s2) modulated by a second sound signal (ts2) and having a second higher frequency (f2) are coupled into the coaxial cable (K). When the first signal (s1) is received in a receiver (E) defective shielding (S(d)) in a region (B) is indicated by acoustic reproduction of the first sound signal (ts1) and, when the second signal (s2) is received, the position (P) of the defective shielding (S(d)) is indicated by acoustic reproduction of the second sound signal (ts2).

Figure 1

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430 Rec'd PCT/PTO 26 SEP 2000

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

CHANGE OF ADDRESS OF APPLICANTS' REPRESENTATIVE

APPLICANT(S): Rolf Block
ATTORNEY DOCKET NO.: P00,0703
INTERNATIONAL APPLICATION NO: PCT/DE99/01318
INTERNATIONAL FILING DATE: 03 May 1999
INVENTION: **METHOD FOR DETERMINING THE POSITION OF DEFECTIVE SHIELDING
OF A COAXIAL CABLE OR CONNECTOR IN A COAXIAL CABLE NETWORK**

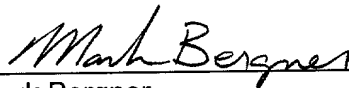
Assistant Commissioner for Patents,
Washington, D.C. 20231

S I R:

Members of the firm of Hill & Simpson designated on the original Power of Attorney have merged into the firm of Schiff Hardin & Waite. All future correspondence for the above-referenced application therefore should be sent to the following address:

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Date: September 26, 2000

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Declaration and Power of Attorney For Patent Application

Erklärung Für Patentanmeldungen Mit Vollmacht

German Language Declaration

Als nachstehend benannter Erfinder erkläre ich hiermit an Eides Statt:

dass mein Wohnsitz, meine Postanschrift, und meine Staatsangehörigkeit den im Nachstehenden nach meinem Namen aufgeführten Angaben entsprechen,

dass ich, nach bestem Wissen der ursprüngliche, erste und alleinige Erfinder (falls nachstehend nur ein Name angegeben ist) oder ein ursprünglicher, erster und Miterfinder (falls nachstehend mehrere Namen aufgeführt sind) des Gegenstandes bin, für den dieser Antrag gestellt wird und für den ein Patent beantragt wird für die Erfindung mit dem Titel:

Verfahren zur Ermittlung der Position
einer defekten Schirmung eines
Koaxialkabels oder Steckverbinders in
einem Koaxialkabelnetz

deren Beschreibung

(zutreffendes ankreuzen)

☒ hier beigefügt ist.

☐ am _____ als

PCT internationale Anmeldung

PCT Anmeldungsnummer _____

eingereicht wurde und am _____

abgeändert wurde (falls tatsächlich abgeändert).

Ich bestätige hiermit, dass ich den Inhalt der obigen Patentanmeldung einschliesslich der Ansprüche durchgesehen und verstanden habe, die eventuell durch einen Zusatzantrag wie oben erwähnt abgeändert wurde.

Ich erkenne meine Pflicht zur Offenbarung irgendwelcher Informationen, die für die Prüfung der vorliegenden Anmeldung in Einklang mit Absatz 37, Bundesgesetzbuch, Paragraph 1.56(a) von Wichtigkeit sind, an.

Ich beanspruche hiermit ausländische Prioritätsvorteile gemäss Abschnitt 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 119 aller unten angegebenen Auslandsanmeldungen für ein Patent oder eine Erfindersurkunde, und habe auch alle Auslandsanmeldungen für ein Patent oder eine Erfindersurkunde nachstehend gekennzeichnet, die ein Anmeldedatum haben, das vor dem Anmeldedatum der Anmeldung liegt, für die Priorität beansprucht wird.

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

the specification of which

(check one)

☐ is attached hereto.

☐ was filed on _____ as

PCT international application

PCT Application No. _____

and was amended on _____
(if applicable)

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a)

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

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German Language Declaration

Prior foreign applications
Priorität beansprucht

Priority Claimed

198 24 157.7 Germany 29. Mai 1998
(Number) (Country) (Day Month Year Filed)
(Nummer) (Land) (Tag Monat Jahr eingereicht)

☒ ☐
Yes No
Ja Nein

(Number) (Country) (Day Month Year Filed)
(Nummer) (Land) (Tag Monat Jahr eingereicht)

☐ ☐
Yes No
Ja Nein

(Number) (Country) (Day Month Year Filed)
(Nummer) (Land) (Tag Monat Jahr eingereicht)

☐ ☐
Yes No
Ja Nein

Ich beanspruche hiermit gemäss Absatz 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 120, den Vorzug aller unten aufgeführten Anmeldungen und falls der Gegenstand aus jedem Anspruch dieser Anmeldung nicht in einer früheren amerikanischen Patentanmeldung laut dem ersten Paragraphen des Absatzes 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 122 offenbart ist, erkenne ich gemäss Absatz 37, Bundesgesetzbuch, Paragraph 1.56(a) meine Pflicht zur Offenbarung von Informationen an, die zwischen dem Anmeldedatum der früheren Anmeldung und dem nationalen oder PCT internationalen Anmeldedatum dieser Anmeldung bekannt geworden sind.

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §122, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application

(Application Serial No.)
(Anmeldeseriennummer)

(Filing Date)
(Anmeldedatum)

(Status)
(patentiert, anhängig,
aufgegeben)

(Status)
(patented, pending,
abandoned)

(Application Serial No.)
(Anmeldeseriennummer)

(Filing Date)
(Anmeldedatum)

(Status)
(patentiert, anhängig,
aufgeben)

(Status)
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Ich erkläre hiermit, dass alle von mir in der vorliegenden Erklärung gemachten Angaben nach meinem besten Wissen und Gewissen der vollen Wahrheit entsprechen, und dass ich diese eidesstattliche Erklärung in Kenntnis dessen abgebe, dass wissentlich und vorsätzlich falsche Angaben gemäss Paragraph 1001, Absatz 18 der Zivilprozessordnung der Vereinigten Staaten von Amerika mit Geldstrafe belegt und/oder Gefängnis bestraft werden koennen, und dass derartig wissentlich und vorsätzlich falsche Angaben die Gültigkeit der vorliegenden Patentanmeldung oder eines darauf erteilten Patentes gefährden können.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon

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German Language Declaration

VERTRETUNGSVOLLMACHT: Als benannter Erfinder beauftrage ich hiermit den nachstehend benannten Patentanwalt (oder die nachstehend benannten Patentanwälte) und/oder Patent-Agenten mit der Verfolgung der vorliegenden Patentanmeldung sowie mit der Abwicklung aller damit verbundenen Geschäfte vor dem Patent- und Warenzeichenamt: *(Name und Registrationsnummer anführen)*

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. *(list name and registration number)*

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And I hereby appoint
Messrs. John D. Simpson (Registration No. 19,842), Lewis T. Steadman (47,074), William C. Stueber (46,453), P. Phillips Connor (19,259), Dennis A. Gross (24,410), Marvin Moody (16,549), Steven H. Noll (28,982), Brett A. Valiquet (27,841), Thomas I. Ross (29,275), Kevin W. Guynn (29,927), Edward A. Lehmann (22,342), James D. Hobart (24,149), Robert M. Barrett (30,142), James Van Santen (16,584), J. Arthur Gross (13,615), Richard J. Schwarz (13,472) and Melvin A. Robinson (31,870), David R. Metzger (32,919), John R. Garrett (27,888) all members of the firm of Hill, Steadman & Simpson, A Professional Corporation.

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Voller Name des zweiten Miterfinders (falls zutreffend):		Full name of second joint inventor, if any:	
Unterschrift des Erfinders	Datum	Second Inventor's signature	Date
Wohnsitz		Residence	
Staatsangehörigkeit		Citizenship	
Postanschrift		Post Office Address	

(Bitte entsprechende Informationen und Unterschriften im Falle von dritten und weiteren Miterfindern angeben).

(Supply similar information and signature for third and subsequent joint inventors).

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